Practice: 442 - Irrigation System, Sprinkler

Scenario # 1 **Conversion to Center Pivot System**

Scenario Description: **Missouri**

A surface irrigated field is converted to a center pivot sprinkler irrigation system to improve efficiency and uniformity of applied irrigation water to maintain adequate soil water for the desired level of plant growth and water quality impairment.

Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications).

Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Practice Situation:

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

After Practice Situation:

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers on drops. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.

This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.

Scenario Feature Measure:

Length of Center Pivot Lateral

Scenario Typical Size:	160	Acre	Tot Unit Cost	$511.82

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Center pivot system with	1	Each	$1,117.65	$1,117.65
Materials	Irrigation, Center pivot system with	1300	Foot	$61.74	$80,262.00
Mobilization	Mobilization, very small equipment	2	Each	$55.50	$111.00
Mobilization	Mobilization, medium equipment	2	Each	$200.43	$400.86
				Total Cost:	$81,891.51

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	$332.68	EQIP-HU	$460.64
EQIP-NOI	$383.87	EQIP-HUNOI	$460.64

Practice: 442 - Irrigation System, Sprinkler

Scenario # 2 **Retrofit for Efficiency Improvement**

Scenario Description: **Missouri**

Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water conservation. Scenario includes end booms renozzled with low-pressure nozzles.

Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)

Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Practice Situation:

A center pivot or lateral move system has high pressure sprinklers. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.

After Practice Situation:

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

Scenario Feature Measure:

Length of Lateral Retrofitted

Scenario Typical Size:	1300	Linear Foot	Tot Unit Cost	$5.19

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Irrigation, Sprinkler Package, Renozzle or	1300	Foot	$5.10	$6,630.00
Mobilization	Mobilization, very small equipment	2	Each	$55.50	$111.00
				Total Cost:	$6,741.00

Payment types:

PayType	Unit Payment	PayType	Unit Payment
EQIP	$3.37	EQIP-HU	$4.67
EQIP-NOI	$3.89	EQIP-HUNOI	$4.67